I Claim:

1. A method for treating a lead-containing surface coating on a substrate, comprising the steps of:

(a) applying chemicals to the substrate in successive stages, said chemicals comprising glacial acetic acid, hydrogen peroxide, nitric acid, and ammonium hydroxide; and

(b) after application of the chemicals in step (a), allowing the chemicals to remain on the substrate for a thermochemical leaching period, whereby a resulting chemical reaction removes lead ions from the substrate.

2. A method according to claim 1, wherein the chemicals are applied by means selected from the group consisting of brushing, spraying, and dipping.

3. A method according to claim 1, and comprising allowing a chemical dwell time between each successive stage of chemical application to the substrate.

4. A method according to claim 3, wherein the dwell time is between 30 seconds and 3 minutes.

5. A method according to claim 1, wherein the concentration of glacial acetic acid is within a range of 99% to 175% v/v.

6. A method according to claim 1, wherein the concentration of hydrogen peroxide is within a range of 50% to 70% v/v.

7. A method according to claim 1, wherein the concentration of nitric acid is within a range of 68% to 85% v/v.

8. A method according to claim 1, wherein the concentration of ammonium hydroxide is within a range of 28% to 50% v/v.

9. A method according to claim 1, and comprising rinsing the chemicals from the substrate with water after the thermochemical leaching period.

10. A method according to claim 9, and comprising neutralizing the rinse water prior to disposal.

11. A method for treating a lead-containing surface coating on a substrate, comprising the steps of:

(a) applying chemicals to the substrate in successive stages, comprising a first stage application of glacial acetic acid, a second stage application of hydrogen peroxide, a third stage application of nitric acid, and a fourth stage application of ammonium hydroxide; and

(b) after application of the chemicals in step (a), allowing the chemicals to remain on the substrate for a thermochemical leaching period, whereby a resulting chemical reaction removes lead ions from the substrate.

12. A method for treating a lead-containing surface coating on a substrate, comprising the steps of:

(a) applying chemicals to the substrate in successive stages, comprising a first stage application of 99% to 175% v/v glacial acetic acid, a second stage application of 50% to 70% v/v hydrogen peroxide, a third stage application of 68% to 85% v/v nitric acid, and a fourth stage application of 28% to 50% v/v ammonium hydroxide;

(b) allowing a chemical dwell time of greater than 30 seconds between each successive stage of chemical application to the substrate;

(c) after application of the chemicals in step (a), allowing the chemicals to remain on the substrate for a thermochemical leaching period, whereby a resulting

chemical reaction removes lead ions from the substrate; and

(d) after the thermochemical leaching period, rinsing the chemicals from the substrate with water.

13. A method for treating lead-contaminated soil, comprising the steps of:

(a) aerating the soil;

(b) applying chemicals to the aerated soil in successive stages, said chemicals comprising glacial acetic acid, hydrogen peroxide, nitric acid, and ammonium hydroxide; and

(c) after application of the chemicals in step (a), allowing the chemicals to remain on the soil for a thermochemical leaching period, whereby a resulting chemical reaction removes lead ions from the soil.

14. A method according to claim 13, wherein the concentration of glacial acetic acid is within a range of 99% to 175% v/v.

15. A method according to claim 13, wherein the concentration of hydrogen peroxide is within a range of 50% to 70% v/v.

16. A method according to claim 13, wherein the concentration of nitric acid is within a range of 68% to 85% v/v.

17. A method according to claim 13, wherein the concentration of ammonium hydroxide is within a range of 28% to 50% v/v.

18. A method according to claim 13, and comprising saturating the soil with water after the thermochemical leaching period.

19. A method for treating lead-contaminated soil, comprising the steps of:

(a) aerating the soil;

(b) applying chemicals to the aerated soil in successive stages, comprising a first stage application of glacial acetic acid, a second stage application of hydrogen peroxide, a third stage application of nitric acid, and a fourth stage application of ammonium hydroxide; and

(c) after application of the chemicals in step (a), allowing the chemicals to remain on the soil for a thermochemical leaching period, whereby a resulting chemical reaction removes lead ions from the soil.

20. A method for treating lead-contaminated soil, comprising the steps of:

(a) aerating the soil;

(b) applying chemicals to the aerated soil in successive stages, comprising a first stage application of 99% to 175% v/v glacial acetic acid, a second stage application of 50% to 70% v/v hydrogen peroxide, a third stage application of 68% to 85% v/v nitric acid, and a fourth stage application of 28% to 50% v/v ammonium hydroxide;

(b) allowing a chemical dwell time of greater than 30 seconds between each successive stage of chemical application to the soil;

(c) after application of the chemicals in step (a), allowing the chemicals to remain on the soil for a thermochemical leaching period, whereby a resulting chemical reaction removes lead ions from the soil; and

(d) after the thermochemical leaching period, saturating the soil with water.